

## Book reviews

**Office of Technology Assessment, Washington D.C.: Impacts of Applied Genetics. Micro-Organisms, Plants and Animals.** Office of Technology Assessment, Congress of the U.S. Wash. D.C. 1981. xii + 331 pp., several figs. and tabs.

The Office of Technology Assessment provides the U.S. Congress with information on scientific developments that may affect peoples' lives in either a beneficial or a harmful way. The present OTA study is a very informative, yet comprehensive, overview of the recent progress in breeding plants and animals and the genetic manipulation of microorganisms. Part I is entitled "Biotechnology" and comprises five chapters describing the role of applied genetics in fermentation, pharmaceutical, chemical and food processing industries as well as its impact on the degradation of environmental pollutants. The study illustrates the practical applications of genetic engineering techniques for the pharmaceutical industry (e.g. production of human insulin, interferon, growth hormone, urokinase and somatostatin) and contains a compilation of additional substances attractive for production by engineered microorganisms. In addition, the limitations of using engineered microorganisms are pointed out. Part II of the study deals with the application of genetics to plant and animal breeding. Estimates indicate that applied genetics is responsible for as much as 50% of the increase in harvests obtained over the past years. It is notable that the average yield of crops increased considerable between 1930 and 1978 (e.g. for corn it amounts to 320%). The second chapter of part II outlines the advances in reproductive biology which are about to revolutionize our ability in animal improvement.

Over the past years the development and application of genetic engineering techniques have raised considerable debates on the questions of risk and responsibility. Consequently, the OTA study also deals with these questions and contains chapters considering risk assessment, the problem of regulating scientific research by guidelines and/or laws and the problem of patenting live organisms. In addition, some special technical and market information is provided.

The present OTA study will not only be useful for geneticists, biochemists, microbiologists, plant and animal breeders but may also help economists and politicians to plan the application of scientific knowledge.

E. Günther, Greifswald

**Krimsky, S.: Genetic Alchemy. The Social History of the Recombinant DNA controversy.** Cambridge, Mass./London, England: MIT-Press 1982. xiii + 445 pp. Hard bound \$ 19.25.

Most scientists of my acquaintance believe the scenarios they envisage and the conclusions they draw are arrived at by an objective assessment of the facts, larded with intuition and experience. Nonetheless, there would be no quarrel with the view stated in the introduction to this book – that the positions scientists take on controversial issues are influenced by factors apart from and outside of this objectivity. The weighting given to these factors by a non-scientist such as Dr. Krimsky is bound to be different to that of scientists, and much of this book is fascinating and compelling reading for those of us (and I include myself) who probably take little enough account of such views. The almost unconscious acknowledgement of a bias implied in the introduction to this book is

reinforced and defined by the assertion (page 15) that "moral imperatives are surer guides than the technological fix". I just can't agree with such a sweeping generality: Whose imperative? What fix? There are many more positions than this.

As one who works in this area, outside the USA, I found the description of events leading to and including the Asilomar Conferences fascinating and full of detail of which I was unaware. There is a clear account of the rapid involvement and influence of people and groups outside of that small group of specialists normally acutely interested in any new (even if it is spectacular) discovery. If the scientific communities of all countries are not yet aware of the interest in science and the political power and expertise of many groups looking for causes to use and espouse, then this book will enlighten them. It should also remind scientists to use the same care in presenting their cases to scientific laymen as they would to a scientific audience.

The biohazard issue, with the benefit of hindsight, appears to have been a storm in a teacup but has left behind a whole host of regulatory and bureaucratic procedures in many countries. This book concentrates entirely on the centre and origins of the problem in the USA. Other solutions have been found, often with a lot less agony in other parts of the world. At US\$ 19.25 this book is easy, enjoyable and instructive reading, although we should be aware that the way Dr. Krimsky sees the story – as with all history – is his own view.

N.S. Scott, Adelaide

**Müntz, K.: Stickstoffmetabolismus der Pflanzen. Bausteine der Modernen Physiologie.** Jena: VEB Gustav Fischer 1984. 331 pp., 131 figs., 33 tabs. Soft bound DM 72,-.

This paperback provides an excellent comprehensive coverage of Nitrogen Metabolism in Plants. Professor Müntz divides the topic into three sections. Section I covers the assimilation of inorganic nitrogen and metabolism of low molecular weight nitrogenous constituents. The section begins with coverage of nitrogen fixation and proceeds to nitrate metabolism including nitrification and denitrification. Following discussion of the incorporation of ammonia into organic constituents description is given of the synthesis of protein amino acids. The synthesis of non-protein amino acids and the role of amino acids in the synthesis of other low molecular weight nitrogenous constituents is described and in the final chapter of the section the synthesis of nucleotides and ureides is discussed. The second section describes the transport of nitrogenous constituents within the plant. The final section is devoted to a description of metabolism of high molecular weight nitrogenous compounds. After describing nucleic acid and protein synthesis the metabolism of these constituents during seed and fruit development and seed germination is described. The final chapter describes nucleic acid and protein metabolism during leaf development and senescence.

The text contains numerous literature citations current to 1982. The subject content is excellent for a text for graduate student courses and the extensive literature coverage makes it a useful acquisition for investigators in any phase of nitrogen metabolism in plants.

L. Beever, Norman (Okla)

**Willis, M.B.: Züchtung des Hundes.** Stuttgart: Ulmer 1984. 450 pp., 78 figs., 98 tabs. Hard bound DM 98,-.

A book on genetics for dogbreeders was published by Hutt in May 1979 and by Willis in October 1979. This last book has now been translated into German, but nothing has been added in the five years that passed since. For instance, in the discussion on coat colors in dogs (15 pages in general and 31 pages specialized for breeds) no reference is made to Silvers': The coat colors of Mice, a Model for Mammalian Gene Action and Interaction (1979). The major difference between the books by Hutt and Willis was a matter of scientific detail in referring to the original literature. In Hutt's book, for instance, only three alleles in the Aguti-series are discussed and in Willis' book five alleles (Silver mentions 17 alleles in the mouse). Hutt gives an introduction and Willis reviews all known details on the genetics of the dog. It has to be regretted that the German translation of Willis' book has not been brought up to date. In 1979 it was really a handbook, but in 1984 this claim in the title is debatable.

The book contains 17 chapters: two on general genetics, ten on specialized genetics of organ systems, one on coat color genetics of many well known breeds and four chapters on methods of selection procedures in breeding. The inter- and intra-specific evolution of the dog and its races is a missing topic that interests many a layman. Gene mapping and homologies between mammals and man and maybe other scientific topics could have been expected. Most breeding problems which serious dogkeepers experience can be found in the text, e.g. "white boxers". But the author already warns "Dieses Buch wird stellenweise nicht einfach zu lesen sein" (page 15). There are only some minor inconsistencies (e.g. fig. 8 page 38 AABB once "schwarz" and once "dunkel"), but the authors extensive wide reading (28 pages of literature references), discussed on every topic with pro's and con's will make it a waxwork show for the simple breeder. The book has to be recommended to all German-reading veterinarians and those dogbreeders who are willing to make a study of their hobbies. The chapters on breeding purposes and methods are especially very informative and worth studying.

S. J. Geerts, Nijmegen

**Wilkins, N.P.; Gosling, E.M. (eds.): Genetics in Aquaculture. Development in Aquaculture and Fisheries Sciences, Vol. 12.** Elsevier: Amsterdam, Oxford, New York 1983. X + 425 pp., several figs. and tabs. ISBN 0-444-42209-9. Hard bound Dfl. 215,- (at present rate US \$ 60.00).

This book is an exact reprint – including the errors – of volume 33 of the journal "Aquaculture" by the same publisher. The book comprises somewhat more than two-thirds of the contributions presented to the International Symposium on Genetics in Aquaculture, held at the University College, Galway, Ireland, 29 March to 2 April 1982. There is no explanation given why the remaining one-third of the contributions are not covered, neither an indication whether or where these have been published. As such, this book covers (be it partly) one of the first symposia in which the present state of the art in genetics in aquaculture is assessed and reviewed.

The whole field of genetics as regards aquaculture is nicely dealt with in 7 sections, e.g. population genetics and genetic markers, inheritance and quantitative genetics, domestication and response to controlled environments, inbreeding, hybrids and hybridization, chromosomal genetics and ploidy, and sex reversal and monosex culture. Each section is introduced by a review paper.

The last part of the book contains 4 synopses of as many workshops (held on the last day of the symposium), focussed on cold respectively warm water fish species, crustaceans and molluscs. In my opinion these synopses really provide "added value" to the volume, especially by explicitly illustrating the differences in interest – and thereby in attitude, approach and objectives – between those engaged in fishery enhancement and those concerned with aquaculture. In view of these differences a plea is posed to disciplinary "unify" participants in future events of the same nature. Personally I do not agree with this; reading through what has been contributed to important topics such as selection on growth rate and selection on feed conversion efficiency, I got the feeling that these particular fields could benefit from disciplinary expertise with respect to feeding and growth, especially in experimental design.

On one hand the book is wide-ranging as it deals with finfish, shellfish, prawns and aquatic plants. However, on the other hand the book is narrow in the sense that the authors of the contributions represent only 10 nationalities; over two-thirds of the contributions are from Canada, Norway, UK and USA and – understandably from this – genetics of salmonids is a major item. There are no contributions from "Eastern" countries (except one from Japan) and the results of genetic research from these countries are hardly referred to.

Apart from these short-comings, the book provides an excellent overview of present knowledge and research directions in this particular field.

As for its future market value I am a little doubtful: the book has rather a scientific character, and this, together with its high price, makes the book less suitable for the practical fish farmer.

However, based upon its contents it certainly deserves a place in libraries and scientist's working rooms . . . provided Vol. 33 of Elsevier's journal "Aquaculture" is missing on the book shelves.

E. A. Huisman, Wageningen

**Bálint, A.: Physiological Genetics of Agricultural Crops.** Budapest: Akadémiai Kiadó 1984. 167 pp., 45 figs., 94 tabs. Hard bound \$ 13.00.

There are few good books on the physiological genetics of crop plants but there is a great need for literature which describes the physiological and genetics concepts important for the application of the biotechnologies to crop plants. This book covers some of these concepts but deals primarily with the upper level of plant organization with some discussions of enzyme activities. Unfortunately there are no contributions from the more recent genetic studies at the molecular level. Nonetheless, the book is a welcome contribution to the field.

The most appealing aspect of this work is the number and quality of tables extracted from the world literature. These tables provide a good literature reference and they should be of value to beginning and advanced readers. The author reveals awareness of whole plant/enzyme interrelationships frequently neglected by molecularists. The most interesting and convincing chapter in terms of developing a theme was the chapter on heterosis – an area in which the author has direct research interests. The book represents a compilation of important ideas and work in plant productivity.

In spite of the extensive data presented for a small book there are some aspects of the work that detract from its effectiveness and appreciation by the reader. In the early chapters there is awkward and imprecise use of the language. For

example, "Tissue development is based on the apical meristems", and, "In respect of the rate of division we distinguish stable zones" represent imprecise statements. Terminology is not always precise and the meaning not always clear. Also, the book lacks subject continuity which makes it more difficult to read. This forces the reader to jump from one set of conditions to another without proper introduction and transition. It is unfortunate that one of the strengths of the book, i.e., the compilation of data tables from international sources, is also the cause of another weakness. The lack of subject continuity and the very small subject index detract materially from the full potential of this book.

This small and relatively inexpensive book merits examination by physiologists and geneticists. It represents valuable data from wide sources but suffers from lack of continuity and focus.

G. Schaeffer, Beltsville

**Mizrahi, A.; Wezel, A.L. van (eds.): Advances in Biotechnological Processes, Vol. 3.** New York: Alan R. Liss 1984. xv + 360 pp., several figs. and tabs. Hard bound £ 52.00.

As yet another volume in the new series of biotechnology this book covers a rather broad selection of rapidly growing areas in industrial microbiology. It contains eleven chapters which are written by leading scientists in the field from academic and industrial institutions.

The first two chapters deal with fermenter instrumentation and control as well as industrial application of fermentation kinetics. A valuable overview is presented on long-term storage of various microorganisms, especially by cryopreservation. A new and modern approach to combat cancer is outlined by D. P. McIntosh who describes the techniques of producing antibody-toxin conjugates. New developments in the extremely important antitumor anthracycline antibiotics are reported in two concise chapters. The fermentative production as well as biosynthesis, regulation and genetic aspects of ergot alkaloids are summarized in a very informative chapter. The next article describes microbial coal desulfurization processes from both microbiological and engineering standpoints. The advantages and present limitations of this procedure are critically discussed. Development, application and various other aspects of microbial insecticides based on *Bacillus thuringiensis*, *Bacillus sphaericus* and *Baculoviridae* are the content of the final three chapters.

A large list of references, which includes the full title of cited articles, are to be found at the end of each chapter. Overall, the material is clear and well-presented and is recommended to the growing community who are interested in biotechnology.

D. Gröger, Halle/Saale

**Hervé, Y.; Dumas, C. (eds.): Incompatibilité Pollinique et Amélioration des Plantes.** Rennes: Ecole Supérieure Nationale Agronomique, Dépt. de Formation Continue 1984. 215 pp.

This document presents the full text of the proceedings of a national meeting held in June 1983 at the University of Lyon. With the exception of Yolande and John Heslop-Harrison and Bruce Knox it was exclusively a French meeting: most of the papers are 'en français', which unfortunately reduces the accessibility to the information very much. It becomes evident that quite a number of French geneticists and plant physiologists have turned to studying incompatibility. One gets the impression that with the pioneering work of C. Dumas at Lyon, it became quite fashionable to direct attention to the

pollen tube - pistil interaction with emphasis on the incompatibility barrier. The French groups at Lyon, Tours, Pay, Strasbourg, Angers and Dijon concentrate on *Brassica*, *Cichorium*, *Prunus*, *Petunia*, *Lycopersicon* and various trees (*Corylus*, *Populus*, *Larix*). Several interesting reports can be mentioned: the application of NMR spectroscopy to test pollen viability, new cases of pollen tube competition, and pollen-ovule relationships in gymnosperms. This meeting again gives an interesting snapshot on the state of knowledge of a most important phenomenon in plant breeding.

H. F. Linskens, Nijmegen

**IBPGR and ICRISAT (eds.): Revised Sorghum Description.** Rome: IBPGR Secretariat 1984. 36 pp., 7 figs.

The International Board for Plant Genetic Resources (IBPGR) and the International Crop Research Institute for the semi-arid tropics (ICRISAT) have recently published a revised list for sorghum (*Sorghum* spp.) based on the work of its advisory committee on Sorghum and Millet Germplasm. The revised list supersedes an earlier one dating from 1980. The list uses the following definitions for documentation purposes: passport data (accession number, donor name and identification number, scientific name, pedigree/cultivar name, acquisition date, last regeneration/multiplication, accession size, type of maintenance) characterization (recording of characters highly heritable, easily seen by the naked eye and expressed in all environments) and preliminary evaluations (records of a limited number of additional traits). The list will be useful for all sorghum breeders.

H. F. Linskens, Nijmegen

**Williams, J. T. with the assistance of Garrett, B.: Crop Genetic Resources. A Slidepack with Text.** Rome: International Board for Plant Genetic Resources. Executive Secretariat FAO 1983. 66 pp., 60 figs. in color.

The IBPGR takes care for its PR. In 1981, the secretariat, which acts as the international headquarters, produced a slidepack which explains what crop genetic resource work consists of and how the IBPGR contributes to this field. This slidepack, with text, became generally available in 1983: sixty colour slides and a text in ten different languages. The booklet accompanying the slide presentation is also self-contained and can be used as a teaching device on its own.

The presentation is a well-illustrated documentation of the importance of new agricultural technologies, on the protection against pests and diseases, as well as on the improvement of crops by deliberate breeding programmes to produce more productive varieties. The importance of keeping collections of traditional populations found throughout the world is emphasized. The only researcher mentioned by name is N. I. Vavilov with respect to centres of diversity. Globally, the highest crop priorities are given to wheat, *Phaseolus*, *Cassava* and coffee, with the second being occupied by *Sorghum*, pearl millet, rice, groundnut, cowpea, potato, oil palm, coconut, brassicas, amaranth and eggplant. Corn, lentils, bomtare ground nut, yam, sunflower and grape follows the third. Even collections, gene banks and tissue culture are mentioned.

When the IBPGR was started it was supposed that the establishment of a number of regional plant genetic resources centres would be the best approach. In order to provide sufficient national strength in certain countries, i.e. certain priority regions, it was however, decided to adapt a regional approach with regards to funding and assistance so that a global network could be generated. This effort to conserve

dwindling plant genetic resources serve a worldwide purpose. The slide series can help to open and broaden minds.

H. F. Linskens, Nijmegen

**Davidson, E.H.; Firtel, R.A. (eds.): UCLA Symposia on Molecular and Cellular Biology. New Series, Vol. 19: Molecular Biology of Development.** New York: Alan R. Liss 1984. xxv + 685 pp., several figs. and tabs. Hard bound £ 73.00.

This book is the result of a symposium held at Steamboat Springs, Colorado on April 1-7, 1984, emphasizing some of the major conceptual problems of development. As a consequence, the book is a very diverse, and yet substantial compendium of recent research utilizing a variety of experimental systems to solve developmental questions. The coverage of the *Xenopus*, *Drosophila*, and *Dictyostelium* systems is excellent, and is well-represented by the major laboratories in the field. The coverage of plant systems however, though very nicely done by the participants, is very minimal in the context of the total effort represented by the book. Although, as the editors point out, it is not possible to include everything, some work with yeast and other aspects of *Drosophila* could have been included; however, these omissions do not detract greatly from the volume. It would also have greatly enhanced the volume if there was an introductory chapter or summary with well-deliberated discussions of the interrelatedness of the findings reported (both within and between systems).

However, even without this, the book is a very useful up-to-date reference work which should prove a helpful aid to all biologists.

J. G. Scandalios, Raleigh

**Dustin, P.: Microtubules (2nd totally rev. edn.).** Berlin, Heidelberg, New York, Tokyo: Springer 1984. xviii, 482 pp., 175 figs. Hard bound DM 159,-.

The second, totally revised edition of 'Microtubules' by P. Dustin intends, as stated in the introduction, "to give a good overall view of all the fields in which microtubules are important".

So it does in 12 chapters: starting with the historical background (chapter 1) it describes in detail structure and chemistry of tubulins and microtubules (chapter 2), their general physiology, the variety of structures formed by microtubules, the microtubule poisons and the role of microtubules in cell shape, cell movement and cell secretion (chapters 3-8). Separate chapters are devoted, not only to mitosis (chapter 10), but also to nerve cells (chapter 9) and the significance of microtubules in pathology and medicine (chapter 11). It closes with a postscript and outlook (chapter 12) and an addendum of recent papers up to the first half of 1983. Many figures have been added or replaced. In addition, a wealth of detailed information is presented, including a bibliography of about 2,400 references.

Though the relation of microtubules with microfilaments is discussed in chapters 7 and 10, dealing with, respectively, cell movement and mitosis, the relation of microtubules with other cytoskeletal elements could have been discussed more extensively. The cytoskeleton as a concept is only mentioned in

chapter 12. - Postscript and Outlook. Also, a more extensive description of current immunological techniques would have been useful. The insertion of recent papers and reviews in an addendum is exemplary. One of the most striking abilities of the living cell is its capacity to build up a variety of structures, with functions to match, from a limited number of relatively simple elements. Pierre Dustin has succeeded very well in showing that tubulins and microtubules are used as such elements.

The second edition of 'Microtubules' is a must for everyone interested in microtubules.

J. Derksem, Nijmegen

**MacMahon, B.; Sugimura, E. (eds.): Coffee and Health. Banbury Report No. 17.** Cold Spring Harbor: Cold Spring Harbor Laboratory 1984. 259 pp., many figs. and tabs. Hard bound \$ 57.-.

Humans have been drinking coffee for as long as they have been smoking cigarettes and drinking alcoholic beverages. Approximately 5 million tons are produced annually in some 50 coffee-growing nations. The problem of coffee and health came under discussion during the Banbury Center Conferences in 1983.

Banbury Report 17 contains papers and discussions which view this problem from several aspects: the chemistry of coffee, instant coffee and decaffeinated coffee; the mutagenicity and the carcinogenicity of coffee; coffee and heart disease.

This book provides a good overview of these topics. The problems of coffee carcinogenesis and mutagenesis are discussed intensively. The conclusion arrived at is that at the present time there is no reason to state that coffee is carcinogenic with respect to the human being.

After reading this book I am drinking my cup of coffee with more pleasure than before. This book is useful to food chemists, nutritionists, physicians, biochemists and geneticists.

F. H. Herrmann, Greifswald

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## Announcement

### Genetic Engineering of Animals, an Agricultural Perspective

As part of the conference series on genetic engineering of the College of Agricultural and Environmental Sciences of the UCD, in cooperation with the Council for Research Planning in Biological Sciences, an international conference will be organized from September 9 to 12, 1985.

The program will appeal to a broad audience in animal research, and will try to increase awareness of how genetic engineering may aid further research efforts and animal agriculture. Live demonstrations will highlight the program.

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